FINAL SOLICITATION FOR SUBMISSION OF FINANCIAL ASSISTANCE APPLICATIONS, OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY SOLICITATION NUMBER DE-PS36-00GO10500

ENERGY EFFICIENCY SCIENCE INITIATIVE

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All information regarding this solicitation is available on the Department of Energy Golden Field Office web site at: *http://www.eren.doe.gov/golden/solicitations.html*

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I. INTRODUCTION

A major goal of the **Office of Energy Efficiency and Renewable Energy** (EERE) is to advance research and development (R&D) of energy technologies — at universities, in the private sector, in national laboratories, inside DOE, and by other non-Federal entities — by exploring and exploiting *synergies* among different research fields, technologies, investigator communities, and end-use applications. This cross-cutting approach seeks to widen EERE's research and development activities between energy efficiency technologies and clean energy, particularly among distributed power generation applications; among industrial and buildings systems; and between transportation and stationary power applications. This approach also seeks to expand and formalize existing cooperation with the **Office of Fossil Energy** in such areas as natural gas-fueled turbine and fuel cell technologies; combined heat, power, and cooling applications; hydrogen production; and carbon emissions avoidance and sequestration. It further aims at more extensive coordination with the **Office of Science** in pursuing fundamental research in areas that are critical to energy efficiency and clean energy development, such as basic biosciences, heat transfer, new materials, catalysts, and computational science.

In this context, the **Energy Efficiency Science Initiative** is intended to focus funding and effort on "bridge" R&D that falls between exploratory research, traditionally the province of university researchers, and pre-commercial applied R&D, where private sector firms and research institutions normally devote their efforts. Often this middle ground of research — crucial to identifying and proving the feasibility of multiple potential applications of a given fundamental scientific discovery — does not receive sufficient emphasis. For example, there are situations where an existing technology has obvious potential for significant performance and design gains, "if only" an identified hurdle can be overcome by a breakthrough in the application of the science underlying that technology.

Teaming, and the exploitation of synergies that teaming encourages, is also a major objective of this solicitation. Therefore, EERE expects that university researchers will lead the research effort along with teams that may include national laboratory, private sector, and other non-Federal investigators. In keeping with EERE's goal of emphasizing the wide range of potential energy-related applications stemming from successful "bridge" R&D projects, we seek to encourage formation of project teams that represent a variety of resources, types of R&D expertise and experience, and potential venues for carrying project results to the next stage of applications development.

It is estimated that funding of approximately $10.7 million will be available for 10 to 15 awards under this solicitation in fiscal year 2000. The amount of funding for individual awards in fiscal year 2000 is expected to range from $300,000 to $1 million. Projects may be proposed with performance periods of either one year or multiple years, up to a maximum of three years.

A. Objective:

The primary objective of this solicitation is to pursue "bridge" research and development (R&D) with ultimate applications that will promote energy efficiency. This category of R&D occupies the spectrum between exploratory science and pre-commercial applied R&D.

B. Scope:

Program Areas of Interest. There are six specific areas of interest for this solicitation: (1) advanced materials; (2) biomass resource development; (3) combustion-related research; (4) sensors and controls; (5) computational sciences; and (6) energy storage and power conversion systems. Applicants may submit more than one proposal, each covering a single program area of interest or multiple program areas of interest. Applicants are encouraged to submit proposals which cover multiple program areas of interest. Descriptive information on each of these areas is provided in the following paragraphs. The examples provided in each Program Area of Interest below are not intended to be an all inclusive list of potential projects.

(1) Advanced Materials - Improved materials and a greater fundamental understanding of materials behavior could lead to significant improvements in the efficiency of energy production, distribution, storage and conversion. The availability (and utilization) of advanced materials is often the key to achieving a breakthrough in performance and cost necessary for the successful development of a variety of processes and technologies. Specific needs include, but are not limited to, the following:

- Increased understanding and control of materials structure, morphology, composition, and processing, to improve, for example, wear resistance, performance in harsh environments, creep resistance, corrosion resistance, strength or weight.
- Improved understanding of properties of semiconductor and similar materials for applications in power control systems, integrated circuits, photovoltaics, thermophotovoltaics, solid-state lighting, and electrochromic windows.
- Fundamental understanding of (and improvements in) high-temperature superconducting materials required to develop widespread applications in electronic and power conversion systems.
- Fundamental improvements to phase-change materials for applications involving energy storage and heat transfer.
- New or improved thin-film materials and membranes and an improved understanding of their behavior for application to fuel cells, advanced batteries, ultracapacitors, gaseous separations, solid-state lighting, and electrochromic windows.
- New or improved catalysts for applications in engine emission reductions, production of chemicals from natural gas, photo-catalytic production of hydrogen from water, and fuel cell electrodes and reformers.
- Improvements in electro-optical materials, processes, and devices for application to solid-

state lighting and electrochromic windows and better characterization of luminous plasma materials.
- Advancements in methods for forming complex shapes from ceramic fiber composites and other materials.
- Advancements in nondestructive evaluation (NDE) techniques of properties of advanced materials.

(2) Biomass Resource Development - Biomass from our nation's crops, forestry and agricultural wastes has the potential to provide a sustainable source of raw materials to power homes, fuel vehicles, and create industrial and consumer products, while also improving air and water quality and reducing emissions of greenhouse gases. Scientific advances are sought to enable biobased resources to produce affordable energy (electricity; liquid, solid, and gaseous fuels; and heat); commodity chemicals and other traditionally high-volume materials or consumer products; and products with a high carbon sequestering capacity. Specific research needs include, but are not limited to, the following:

- Research on biosynthesis pathways in annual and perennial crop plants to expand the range of bioenergy and co-product options.
- Research to develop biosensors, chemical analysis tools, and appropriate methodologies to measure plant characteristics and facilitate more efficient conversion to biobased products and bioenergy.
- Research on energy crop selection methods for specific traits and properties, including the development of tools for understanding and predicting trait development.
- Fundamental research on the conversion of new or improved biomass and derived products into fuels, chemicals, electricity, and multiple products.

(3) Combustion-Related Research - Key research challenges involve providing data and techniques for understanding or predicting the efficiency and emission characteristics of combustion devices for optimization and control of their performance. Innovative research is needed to: (1) obtain values of chemical reaction rates; (2) elucidate combustion mechanisms; and (3) model and analyze combustion flow patterns and fluid dynamics. Research is also needed on: (1) innovative concepts for clean, efficient combustion of gaseous, liquid, or solid fuels; (2) better processes for burning low-grade fuels in combustors; and (3) improved methods for gas cleanup. Technological gaps relative to improved understanding and control of combustion processes exist for the following system configurations and applications:

- Biomass power systems employing syngas combustion processes;
- Fossil fuel combustion systems (e.g., those using diesel or natural gas, and including those with application to thermophotovoltaic systems);

- Combustion systems used in manufacturing operations, particularly those of recovery boilers, furnaces, and direct-fired heat exchangers;
- Multi-phase combustion processes; and
- Biomass/fossil co-combustion systems.

(4) Sensors and Controls - Scientific advances in sensors and controls will lead to better process optimization, which has a direct energy-saving impact on the transportation, buildings, power generation, and industry sectors. Sensors and controls also will help address carbon emission reductions and carbon sequestration, either as enabling technology elements of integrated systems or as essential technologies for maximizing energy efficiency at minimal cost without degrading process quality. Sensors and controls also are needed for systems that integrate interior climate control, lighting, and indoor air quality in order to enhance worker health and productivity while minimizing energy consumption. Research needs include, but are not limited to, the following:

- Advances in (1) performance stability in harsh environments (e.g., high temperatures, corrosives, high pressures); (2) control of frequency modulation, power conversion, and power surges/drops; (3) sensor spatial resolution capability; (4) reductions in the size and cost of sensor and control components; and (5) characterization of materials interfacial performance.
- Sensors and fusion of sensors data to allow on-line monitoring, diagnosis, and/or control of machine operations.
- Integrated and discrete measurement and reporting systems for remote and unattended operations that provide real-time chemical and physical data for novel applications in energy generation, distribution, and consumption.
- Sensors and controls for observing, measuring and responding to levels of pollutants within an occupied space.
- Advances in innovative sensors for NDE applications .

(5) Computational Sciences - Research in computational sciences can significantly advance energy efficiency by aiding in the design, development and testing/evaluation of new types of energy production, conversion, storage, distribution, and end-use. For example, utilities are utilizing supply-side information technologies for improved operation of their generation, transmission, and distribution facilities, as well as demand-side energy information services. In addition, sensors and intelligent systems relying on interactive digital communication links are penetrating deeper into the distribution system and onto customer premises, providing potential opportunities for utilities to provide higher quality electric service with greater efficiency (the "Intergrid"). Due to recent advances in simulation fidelity and the rapid reduction of computing costs, simulations are becoming a cost effective method of analysis. Research needs include, but are not limited to, the following:

- High-performance computing for power systems analysis, including tools for analyzing systems behavior (dynamic and static); real-time models of system behavior; energy storage modeling; modeling and simulation tools for demand-side management; and on-line power distribution and control models.
- Computer visualization, simulation, and analysis to improve understanding of large-scale, nonlinear impacts on the economy of changing fuel sources, energy conversion technologies, and energy demand patterns.
- High-speed/high-volume communication to allow information to flow rapidly between closely situated and remote machines and systems, including enhancing the capability to capture and evaluate detailed, real-time process information.
- Computing, data storage, analysis, and interactive communications that would improve grid reliability.

(6) Energy Storage and Power Conversion Systems - Energy storage and power conversion technologies are critically important for transportation (e.g., regenerative braking, engine size optimization, power density gains, peak power demand), for electric services (e.g., network stability, peak shaving, power quality improvement, integration of distributed energy resources), and for residential/small business cogeneration (e.g., reduction of start stop cycling, maintenance of heat and hot water loads). Research needs include, but are not limited to, the following:

- Fundamental advances to improve storage system performance (e.g., round-trip efficiency, delivered power quality, footprint, charge/discharge rates) and economics of integrated energy storage systems, consisting of:

  - energy storage subsystems (e.g., advanced batteries, flywheels, superconducting inductors, ultra-capacitors);
  - integration of hybrid distributed energy generation (e.g., intelligent control systems, optimization of battery/diesel/renewable hybrids);
  - power conversion subsystems (e.g., control systems, magnetics, motors/generators, solid state devices, power electronics); and
  - balance-of-plant subsystems (e.g., cooling systems, packaging, protection circuits, sensors, safety devices).

- Fundamental improvements in power conversion technologies for cross-cutting applications in the building, industry, transportation, and utility sectors, including for example:

  - novel advanced power conversion systems;
  - intelligent environmental control systems for buildings;
  - industrial production and processing systems including controls and sensors for motors; and
  - integrated hybrid vehicle power train systems.

II. GENERAL INFORMATION

A. Participation by DOE Management and Operations (M&O) Contractors

Applications submitted by, or on behalf of: (1) another Federal agency; (2) a Federally Funded Research and Development Center sponsored by another Federal agency; or (3) a Department of Energy (DOE) Management and Operating (M&O) contractor will not be eligible for an award under this solicitation. However, an application that includes performance of a portion of the work by a DOE M&O contractor will be evaluated and may be considered for award, provided the proposed use of any such entity is specifically authorized in writing by the DOE Contracting Officer for the respective M&O contractor or authorized designee and the applicant provides the additional information identified in Section III - APPLICATION PREPARATION INSTRUCTIONS. The responsible DOE Contracting Officer must determine that performance by the M&O contractor: 1) is consistent with or complementary to DOE missions and the missions of the facility to which the work is to be assigned; 2) will not adversely impact execution of assigned programs of the facility; 3) will not place the facility in direct competition with the domestic private sector; and 4) will not create a detrimental future burden on DOE resources.

If a project which includes M&O participation is approved for funding, DOE intends to make an award to the applicant for its portion of the effort and to provide direct funding for the M&O's portion of the effort under the existing DOE M&O contract. The M&O contractor's workscope therefore will not be accomplished through a contract with a recipient as defined in 10 CFR Part 600.3. However, the recipient will be the responsible authority, without recourse to DOE, regarding the settlement and satisfaction of all contractual and administrative issues, including but not limited to disputes and claims, arising out of any agreement between the applicant and the M&O contractor.

If a recipient uses an M&O contractor to perform a portion of the work, the recipient's cost sharing requirement would be based on the total cost of the project, including both the recipient's and the M&O's portions of the effort (See Section II G. Cost Sharing)

B. Time and Place for Submission of Applications

Applications are due at 3:00 PM Eastern Time, on May 1, 2000. Applications must be addressed to: U.S. Department of Energy / NETL, ATTN: William Mundorf, Building 921, 626 Cochrans Mill Road, P. O. Box 10940, Pittsburgh, PA 15236-0940. An application received after the aforementioned date shall be considered a late submission and not eligible for consideration unless it: (a) was postmarked or otherwise dated by commercial carrier not later than the application due date specified above (PRIVATE METERED POSTMARKS ARE NOT ACCEPTABLE PROOF OF THE DATE OF MAILING) and (b) is received

before the technical evaluation of applications submitted in response to the Solicitation begins. The envelope containing the application must be marked Solicitation Number DE-PS36-00GO10500.

If hand carried or courier delivered, applications must be delivered to DOE/NETL, 626 Cochrans Mill Road, Pittsburgh, PA 15236-0940 by the aforementioned time and date. The applicant's courier must complete, sign and have signed by the DOE person accepting the application, a receipt that will be available from DOE.

C. Amendments and Applicant Notice of Intent to Submit an Application

Applicants intending to submit an Application in response to this Solicitation should provide notification electronically to *goscience@nrel.gov*. Notifications must include the Solicitation number and title; Applicant name and organization; project title; Program Area of Interest(s); list of participating organizations; name of the point of contact, telephone number(s), and e-mail address.

Amendments shall be placed on the Golden Field Office Home Page at *http://www.eren.doe.gov/golden/solicitations.html*. Applicants are encouraged to check the Home Page on a regular basis for the posting of amendments to the solicitation.

DOE reserves the right to extend the closing date for Applications, if necessary. If extended, an amendment to the solicitation will be posted on the Golden Field Office Home Page.

D. Questions

To be considered, all questions concerning this solicitation should be submitted by April 17, 2000, electronically to *goscience@nrel.gov*. Questions and responses will be disseminated by amendment to the solicitation and posted on the DOE Golden Field Office Home Page.

E. Award Instrument

It is DOE's intention to make financial assistance awards under cooperative agreements to successful applicant(s). Projects may be proposed with performance periods of either one year or multiple years, up to a maximum of three. If the project is proposed for longer than one year, it is anticipated that pre-determined go/no-go decision points will be negotiated as part of the award process.

A sample Financial Assistance Agreement may be obtained at the Golden Field Office Home Page at *http://www.eren.doe.gov/golden/awarddocs.html*. Appropriate intellectual property provisions will be negotiated and incorporated in any resulting agreement as determined by the applicant's status (state agency, university, large business, non-profit, etc.) and the particular project.

If an application is submitted by a Consortium, or other business arrangement with more than one participant, the participants must structure themselves (e.g., prime Recipient with Subawardees) so that DOE can issue the award to a single legal entity who will be accountable to the terms of the agreement. Negotiation, award, and administration will be in accordance with DOE Financial Assistance Rules (10 CFR Part 600). A copy of 10 CFR 600 may be obtained electronically through the Golden Field Office Home Page at *http://www.eren.doe.gov/golden/paf.html*.

F. Cost Sharing

The nature of cost sharing under this Solicitation will depend on whether the proposed project involves "fundamental research". Fundamental research for purposes of cost share under this Solicitation is defined as "basic and applied research in science and engineering, the results of which are published and shared broadly with the scientific community...."(From National Security Directive # 189).

If a project does not consist of fundamental research, section 3002 of EPAct requires a minimum cost share of 20% of total project costs in order to be considered for award under this solicitation.

If a project meets the definition of fundamental research, section 3002 of EPAct allows DOE to reduce or eliminate the non-federal cost share minimum of 20%. Please refer to Section III.C.4. for application preparation instructions on cost sharing.

In-kind contributions (e.g., contributions of services or property; donated equipment, buildings, or land; donated supplies; or unrecovered indirect costs), incurred as part of this project may be considered as all or part of the cost share as described under 10 CFR Part 600, Sections 600.30, 600.101, 600.123 and 600.224. All participant cost sharing must come from non-Federal sources (i.e., private, state or local Government, or any other sources that were not originally derived from Federal funds).

G. Catalog of Federal Domestic Assistance (CFDA) Number

The CFDA number for this solicitation is 81.086, Conservation Research and Development and should be used for completion of Block 10 of the Application for Federal Assistance, Standard Form (SF) 424. Additionally, it is the opinion of DOE that Executive Order 12372, which requires review of certain financial assistance applications by states, does not apply to this action.

H. EPAct Eligibility Requirements

Section 2306 of the Energy Policy Act (EPAct), Public Law 102-486 establishes eligibility requirements for companies to participate in financial assistance programs covered under Titles XX through XXIII of the EPAct.

All for-profit business entities other than an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)(3)) shall complete Form GO-PF21, EPAct Certification, in order for DOE to make this determination. Based on the information provided, a determination by DOE that the EPAct eligibility requirements are met shall be made as part of the initial review of applications, in accordance with Section IV.B of the solicitation. Additional information may be required for determination of eligibility prior to award. An award cannot be made if the applicant does not meet the eligibility requirements of the EPAct Section 2306.

It should be noted that none of the information contained within the eligibility statement will be considered when evaluating the merit of the application as set forth herein.

In accordance with Section 2306 of the EPAct, Public Law 102-486, 42 U.S.C. 13525, the Participants of a successful application will be eligible to receive financial assistance only if:

1) participation in the project would be in the economic interest of the United States, as evidenced by:
   a) investments in the United States in research, development, and manufacturing (including for example, the manufacture of major components or subassemblies in the United States);
   b) significant contributions to employment in the United States; and
   c) an agreement with respect to any technology arising from assistance provided under this section to promote the manufacture within the United States of products resulting from that technology (taking into account the goals of promoting the competitiveness of United States industry), and to procure parts and materials from competitive suppliers;

   AND
2) the applicant is either:
   a) a United States-owned company or entity; or
   b) incorporated in the United States and has a parent company which is incorporated in a country which affords to United States-owned companies or entities: (1) opportunities, comparable to those afforded to any other company or entity, to participate in any joint venture similar to those authorized under this Act; (2) local investment opportunities comparable to those afforded to any other company or entity; and (3) adequate and effective protection for the intellectual property rights of the United States-owned companies or entities.

I. Sub-Awards to Debarred and Suspended Parties

Applicants and participants, at any tier, must not make any subaward or permit any subaward to any party which is debarred, suspended, or is otherwise excluded from or ineligible for participation in federal assistance programs under Executive Order 12549, "Debarment and Suspension" or is otherwise ineligible hereunder. The list of parties excluded from federal procurement and nonprocurement programs can be accessed through the Excluded Parties List System (EPLS) at *http://epls.arnet.gov*.

J. Financial Assistance for Application Preparation

No funding will be available under the DOE Minority Economic Impact (MEI) loan program for preparation of applications in response to this Solicitation. DOE assumes no responsibility for any costs associated with application preparation or submission of applications if an award is not made. If an award is made, such costs may be allowable as provided in the applicable cost principles.

K. National Environmental Policy Act (NEPA) Requirements

All applicants shall complete an Environmental Checklist, GO-EF1. The Environmental Checklist is a series of questions designed to gather information in the following general areas as related to the proposed project: chemicals, waste generation, emissions, permitting, natural resources and any unique or controversial issues. The requested information will be used by DOE to evaluate any potential impacts (positive and negative) on the environment and be of enough detail for the Department to meet its requirements under NEPA in its selection of applications for negotiation of award.

Applicants are restricted from taking any irreversible action prior to DOE reaching a final NEPA decision regarding the proposed project. Irreversible actions include demolition of existing buildings, site clearing, ground breaking, construction, and/or detailed design. This restriction, however, does not preclude the Applicant from developing plans, preliminary designs, or performing other necessary support work prior to DOE reaching its final NEPA decision, provided the work has been authorized by DOE.

III. APPLICATION PREPARATION INSTRUCTIONS

A. General Instructions

The format for preparing the application is provided below. The application shall be submitted in an original plus five copies. The original application (i.e., original signature) shall be identified as "Original" (No. 1) and the remaining copies shall be consecutively numbered 2 through 6. In accordance with 10 CFR Part 600.210(b)(2), State and Local Government Applicants are required to submit an original and two (2) copies of the application. However, State and Local Government Applicants are encouraged to submit additional copies to expedite the evaluation process.

The proposal shall consist of one volume in two parts, Technical and Cost Information. The Technical Information must be within the page limit described in C. Section I. Applications shall exclude material not essential to a proper evaluation of the application.

To aid in the evaluation, applications shall be clearly and concisely written, as well as being neat, indexed and logically assembled. The applications shall be typed in a minimum of 10 point font on single-sided 8.5" x 11" paper. Illustrations and foldouts should, in general, be no more than 11" x 17" in size. All pages shall be appropriately numbered (including foldouts), and the application shall contain the name of the applicant, point of contact including telephone and facsimile number, electronic mail address, the date, and the Solicitation number. To facilitate orderly and expedient review of the applications, the format prescribed by this document should be followed.

B. Proprietary Application Information

Applications submitted in response to a Solicitation may contain trade secrets and/or privileged or confidential commercial or financial information which the applicant does not want used or disclosed for any purpose other than evaluation of the application. The use and disclosure of such data may be restricted provided the applicant marks the cover sheet of the application with the following legend, specifying the pages of the application which are to be restricted in accordance with the conditions of the legend:

> "The data contained in pages _____ of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the applicant."

Further, to protect such data, each page containing such data shall be specifically identified and marked, including each line or paragraph containing the data to be protected with the legend similar to the following:

> "Use or disclosure of the data set forth above is subject to the restriction on the cover page of this application."

It should be noted, however, that the data bearing the aforementioned legend may be subject to release under the provisions of the Freedom of Information Act (FOIA), if DOE or a court determines that the material so marked is not exempt under the FOIA. The Government assumes no liability for disclosure or use of unmarked data and may use such data for any purpose.

In evaluating applications, DOE reserves the right to use any assistance deemed advisable, in accordance with applicable regulations, including qualified personnel from other Federal agencies, other Government entities, universities, industry, and DOE contractors. These individuals will be required to protect the confidentiality of any specifically identified trade

secrets and/or privileged or confidential commercial or financial information obtained as a result of their participation in this evaluation. Information contained in the applications shall be treated in accordance with the policies and procedures set forth in 10 CFR Part 600.15. Submission of an application constitutes consent to the use of outside evaluators.

C. Section I - Technical Information

The application's Technical Information section may not exceed 20 pages, including all supplemental information, with the exception of resumes (limited to a maximum of 10 pages for all resumes), Field Work Proposal and Authorization from the DOE Contracting Officer if M&O work is proposed.

Section I must include the following documents in the order given below. The information provided in this part of the application must be presented so that the reviewers can evaluate the information against each of the criteria provided in Section IV.D., Technical Evaluation Criteria. Applicants are encouraged to carefully review the evaluation criteria. Applications must contain sufficient information to permit a complete evaluation.

1. Cover Page

   The name, signature, title, address, phone number, facsimile, and electronic mail address of an authorized representative of the Applicant, the name and type of organization, the Solicitation number, the Solicitation title, the total project costs, and cost share must appear on the cover page of the original and all copies of the application. In addition, applicants are required to identify the Program Area of Interest or multiple Program Areas of Interest on the cover page as well as whether their proposed project meets the definition of "fundamental research" as defined in this solicitation.

2. Public Abstract

   A one-page technical summary describing, in general terms, the proposed project must be prepared and submitted with the application. The summary should be informative and contain information which is releasable to the public.

3. M&O Work

   If your application includes work to be performed by an M&O contractor, the following additional information is required:

   a. Application and Field Work Proposal: The application must include a SF 424, Application for Federal Assistance, and budget page for the applicant’s portion of the project and a Field Work Proposal (See DOE Order 412.1 Work Authorization System) for the M&O portion of the project.

The application must also describe: 1) the portion of the project that will be conducted by the applicant and the portion that will be conducted by the M&O contractor and 2) the managerial arrangement between the applicant and the M&O contractor. The amount of work to be performed by the M&O contractor(s) may not be greater than the aggregate amount of work to be performed by all other participants in the project unless a higher level of participation is determined to be in the best interests of the government in advancing the objectives of the solicitation. DOE will review the application to determine that it meets this criteria and reserves the right to reject any application that fails to do so.

b. Workscope: The application must provide a scope of work for the effort to be performed by the applicant and a separate scope of work for the effort to be performed by the M&O contractor.

c. Authorization from the DOE Contracting Officer. The applicant must submit a document from the DOE Contracting Officer for the respective M&O contractor or authorized designee stating that the M&O contractor is authorized to participate in the proposed work effort (See II. General Information, Item B. Participation by DOE M&O Contractors).

4. Information Regarding "Fundamental Research" Projects

Applicants whose proposed project(s) meet the definition of "fundamental research", as defined in this solicitation, must provide the following information:

1) The specific percentage of non-federal cost share (below the 20% EPAct requirement) to be applied to the project, or state "0%" if no cost share is anticipated.
2) A covenant which would require the applicant and all participants to publish results from the research in a timely manner and disseminate those results to the public.
3) An agreement that the applicant and all team participants will not introduce or utilize proprietary data that would restrict the timely publication or dissemination of the results of the research.
4) An agreement that the applicant and all team participants will not establish claim, whether jointly or severally, to copyright in computer software first produced in the performance of their contract without prior written permission of DOE patent counsel assisting the contracting activity.

5. Technical Proposal

Clearly describe the proposed effort and separately address each of the following criteria:

Criteria 1: Technical Merit

Describe how the technology expected to result from the R&D:

- Is innovative.
- Advances the state of the art of the field(s) of technology (and does not duplicate knowledge available in the literature).
- Has potential advantages over competing technologies or provides a foundation for breakthroughs that overcome barriers to technological development.

Criteria 2: Cross-cutting Nature of the Technology

Describe how the proposed research and development has potential to increase energy efficiency and the use of clean energy technologies:

- In multiple EERE end-use sectors and uses.
- By maximizing technological advances in multiple technical areas described in the Program Areas of Interest (Section I.B.).
- By enhancing integration of existing or new components or systems.

Criteria 3: Applicant/Team Capabilities, Organization and Facilities

- Describe the applicant team which has been developed, including each team member's qualifications and experience in the technology areas addressed in the proposal.
- Describe the project organization; identify the roles and responsibilities of each partner for specific tasks and the availability of key personnel to complete the proposed project.
- Present the demonstrated experience and success of the applicant and partners in similar projects.
- Describe the adequacy (quality, availability, and appropriateness) of facilities and equipment to accomplish the proposed project.

Criteria 4: Potential for Energy Efficiency Gains and Other Benefits

- State the potential for significant energy efficiency gains from the technology (where appropriate), considering the dollar value of the project relative to its impact.
- Describe the potential for significant environmental benefits from the proposed technology or product applications.
- Describe the potential for ultimate commercial applications of the proposed R&D or resulting products.
- Address the extent to which technical, regulatory, economic, environmental, production, or other issues will impact the potential for success.

Criteria 5: Approach

- Describe in detail the proposed approach, work plan, and schedule, including performance metrics.
- Provide an explanation how the approach will achieve project goals and performance metrics.

D. Section II- Cost Information

Section II shall be divided into four parts (Application, Budget, Financial Management System, and Certifications and Other Required Forms). All forms can be obtained from the DOE Golden Field Office Home Page at *http://www.eren.doe.gov/golden/applicationdocs.html*.

Section II shall consist of:

1) "Application for Federal Assistance" (SF 424)
2) Budget
   a. "Federal Assistance Budget Information" (DOE F 4600.4)
   b. "Budget Explanation Page for DOE Form 4600.4" (GO-PF20)
   c. Budget Summary by each task in the Work Plan.
   d. Rate Agreement or Proposal for Rate Agreement
   e. Cost Sharing
3) Financial Management System
4) Certifications and Other Required Forms

Part One: Application

"Application for Federal Assistance" (SF 424) This form must be executed by authorized official.

Part Two: Budget

Accurate, complete, and documented estimates addressing the cost to perform the work set forth in the Statement of Work shall be submitted. The budget shall be outlined and supported in accordance with the following instructions:

a) A summary of all cost data shall be submitted on DOE Form 4600.4, "Federal Assistance Budget Information." The costs should include the requested DOE funding and any cost share.

b) The information on Form 4600.4 must be supported by detailed information provided through the completion of "Budget Explanation Page for DOE Form 4600.4", GO-PF20. Schedules may be appended as required to fully detail the

project costs. If cost escalation factors are used in determining cost estimates, these factors shall be clearly defined and justified. Costs for each participant shall be summarized on a separate supplementary Budget Explanation Page and totalled on the Applicant's Budget Information Form, under Item f, Contractual. Fee or profit is prohibited for the entity receiving a financial assistance award.

c) Provide a budget summary by task as indicated in the Statement of Work. All costs (labor, equipment, consultants, etc.) shall be allocated to each task so that the total equals the estimated cost under (a) above.

d) If your organization has a rate agreement in effect with a Federal agency, or if such an agreement is pending, please submit a copy of the agreement, or the proposed rates and a Federal point of contact with the application. If your organization does not have a rate agreement or one is not pending, please submit a supported indirect rate proposal with your application.

e) Identify the percentage level and source of cost sharing for the proposed project. Firm funding commitments are expected and documentation of those commitments must be included in the application. Additionally, the impact of DOE's cost share to the viability of the project must be addressed, to include justification for the need for Federal funds.

NOTE: The total project cost (i.e., sum of applicant and other participants plus DOE cost shares) must be reflected in each completed Budget Explanation Form.

A detailed estimate of the cash value (basis of and the nature, e.g., equipment, labor, facilities, cash, etc.) of all contributions to the project by each participant must be provided. Note that "cost sharing" is not limited to cash investment. In-kind contributions (e.g., contribution of services or property; donated equipment, buildings, or land; donated supplies; or unrecovered indirect costs) incurred as part of the project may be considered as all or part of the cost share. The "cost sharing" definition is contained in 10 CFR 600.30, 600.101, 600.123, 600.224, and OMB Circular A-110.

Foregone fee or profit by the applicant shall not be considered cost sharing under any resulting award. Reimbursement of actual costs will only include those costs that are allowable and allocable to the project as determined in accordance with the applicable cost principles prescribed in 10 CFR 600.127 or 10 CFR 600.222 for the respective participants.

Part Three: Financial Management System

In order to qualify for a financial assistance award, the Applicant must demonstrate a financial management system that satisfies 10 CFR 600.121 or 10 CFR 600.220, Standards for financial management systems, by describing its ability to comply.

Part Four: Certifications and Other Required Forms

All of the following forms, which can be found at *http://www.eren.doe.gov/golden/applicationdocs.html*, must be completed and submitted with the application:

a) The "Financial Assistance Pre-Award Information Sheet" (GO-PF19)
b) The "U.S. DOE Assurance of Compliance" (Form DOE F 1600.5)
c) The "Grantee Certification Regarding Lobbying; Debarment, Suspension and Other Responsibility Matters; and Drug-Free Workplace Requirements" (FA-CERTS)
d) The "Disclosure of Lobbying Activities" (SF-LLL) (To be submitted even if no lobbying is certified.)
e) The "Environmental Checklist" (GO-EF1)
f) The "Energy Policy Act (EPAct) Certification" (GO-PF21) (Each Supplemental Announcement will specify whether EPAct applies.)

IV. EVALUATION OF APPLICATIONS

A. General

It is the policy of DOE that any financial assistance be awarded through a merit-based selection process, which means a thorough, consistent, and independent examination of applications based on pre-established criteria by persons knowledgeable in the field of the proposed project.

B. Initial Review

In order for your application to be evaluated in the comprehensive evaluation phase of the solicitation, the application must meet certain requirements set forth below.
The application shall be reviewed to determine if it meets the following criteria:

(a) The applicant proposes a non-Federal cost share of 20 percent of the total estimated cost of the project, unless the Head of Contracting Activity reduces or eliminates this requirement based on a demonstration by the applicant that the research is “fundamental” in nature; and

(b) If the applicant proposes to use a Department of Energy Management and Operating (M&O) Contractor (e.g., national laboratory) to perform a portion of the work, the proposed use of such entity must be authorized in writing by the DOE Contracting Officer for the respective M&O or authorized designee (based on the review described in Section II.B. of the solicitation) and the applicant must provide the information identified in the Application Preparation Instruction (Section III.C.3. of the solicitation).

(c) EPAct eligibility requirements per Section II.G.

Failure to meet any one of the above criteria may result in the elimination of the application from further consideration in the comprehensive evaluation phase. However, if the Contracting Officer for this solicitation determines that the applicant has made a demonstrated effort to meet these criteria, the Contracting Officer may request the applicant to provide the necessary additional information within five working days.

C. Comprehensive Evaluation

Applications meeting the initial review criteria shall be subject to a comprehensive evaluation in accordance with the technical evaluation criteria listed in this section. The technical evaluation is conducted to determine the merits of the technical application.

Objective merit review of applications will be performed in accordance with 10 CFR Part 600.13 and implemented by the Office of the Assistant Secretary for Energy Efficiency and Renewable Energy in procedures published in the Federal Register on May 19, 1998. DOE reserves the right to fund all, none, or certain parts of the application(s) submitted in response to a Solicitation. All applicants will be notified in writing of the action taken on their applications. Applicants should allow at least 90 days for DOE's evaluation. The status of any application during the evaluation and selection process will not be discussed with applicants. Unsuccessful applications will not be returned to the applicant.

D. Technical Evaluation Criteria

Technical applications submitted in response to this solicitation shall be evaluated in accordance with the criteria listed below.

Criterion 1: **Technical Merit (30 percent)**

Proposals will be evaluated on the degree to which the technology expected to result from the R&D: (1) is innovative; (2) advances the state of the art of the field(s) of technology (and does not duplicate knowledge available in the literature); and (3) has potential advantages over competing technologies or provides a foundation for a breakthrough that overcomes barriers to technological development.

Criterion 2: **Cross-cutting Nature of the Technology (20 percent)**

Proposals will be evaluated on the extent to which the proposed research and development has potential to increase energy efficiency and the use of clean energy technologies: (1) in multiple EERE end-use sectors and uses; (2) by maximizing technological advances in multiple technical areas described in the Solicitation's Program Areas of Interest Section I.B.; and (3) by enhancing integration of existing or new components or systems.

Criterion 3: **Applicant/Team Capabilities, Organization and Facilities (20 percent)**

Proposals will be evaluated on the extent to which the applicant has developed a team with qualifications and experience in the technology areas addressed in the proposal.

Applicants will address the project organization; the roles and responsibilities of each partner for each task; and the availability of key personnel to complete the proposed project.

Proposals will be evaluated on the demonstrated experience and success of the applicant and partners in similar projects.

Proposals will be evaluated on the adequacy (quality, availability, and appropriateness) of facilities and equipment to accomplish the proposed project.

Criterion 4: Potential for Energy Efficiency Gains and Other Benefits (15 percent)

Proposals will be evaluated on the potential for significant energy efficiency gains (where appropriate) from the technology. In evaluating this factor, the reviewers will consider the dollar value of the project relative to its impact.

Proposals also will be evaluated for the potential for significant environmental benefits from the proposed technology or product applications.

Proposals will be evaluated on the potential for ultimate commercial applications of the proposed R&D or resulting products. The application should address the extent to which technical, regulatory, economic, environmental, production, or other issues will impact the potential for success.

Criterion 5: Approach (15 percent)

Applications will be evaluated on the completeness and feasibility of the proposed work plan and schedule and on the likelihood of success in achieving project goals and performance metrics.

E. Cost Evaluation

The cost information will be evaluated in accordance with the following criteria:

(a) Reasonableness and appropriateness of cost;
(b) Adequacy of budget justification and supporting information; and
(c) Nature of cost-sharing proposed, including the method of calculating the value of any in-kind contributions .
(d) Compliance with 10 CFR 600.121 or 10 CFR 600.220, Standards for financial management systems, requirements.

The cost information will not be point scored but will be assigned an adjectival rating (e.g. Adequate, Marginal, or Inadequate). This rating will be considered by the Selection Official in selecting applications for negotiation of award.

F. Program Policy Factors

After the technical and cost evaluations are completed for all applications, the Selection Official will apply the following Program Policy Factors:

1. How the mix of projects achieves the strategic goals of EERE;
2. The diversity of the projects among the technology areas and EERE end-use sectors;
3. The degree of involvement by institutions of higher education; and
4. The level of cost sharing above any minimum requirements.

G. Basis for Selection and Award

DOE anticipates the award of one or more financial assistance instruments to those applicants whose applications are determined to be in the DOE's best interest in achieving the program objectives set forth in this solicitation. Selection of an application by DOE will be achieved through a process of evaluating the merits of complete applications through the technical and cost evaluation factors set forth in this section and by considering the Program Policy Factors.

This process reflects DOE's desire to accept an application based on its potential to best achieve program objectives, rather than solely on evaluated technical merit or cost. Accordingly, DOE may select for award all, none, or any part of an application, based on its decision as to which meritorious applications best achieve the program objectives set forth in this solicitation.

It is important for applicants to note that selection for negotiations will be made entirely on the basis of the submitted applications. Applications therefore should address specifically the factors mentioned in the evaluation criteria and should not depend upon the background knowledge of reviewers.

H. Additional Information

DOE may require Applications to be clarified to the extent considered necessary, through additional written submissions; however, the Award may be made solely on the information contained in the Application.

The following clauses will be included in any award resulting from this solicitation:

Lobbying Restrictions (Interior Act 2000)

The awardee agrees that none of the funds obligated on this award shall be made available for any activity or the publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete. This restriction is in addition to those prescribed elsewhere in statute and regulation.

Notice Regarding Purchase of American-Made Equipment and Products -- Sense of Congress

It is the sense of the Congress that, to the greatest extent practicable, all equipment and products purchased with funds made available under this award should be American-made.

Compliance With Buy American Act

In accepting an award, the recipient agrees to comply with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a - 10c, popularly known as the "Buy American Act"). The recipient should review the provisions of the Act to ensure that expenditures made under the award are in accordance with it.

Appendix A - Definitions

"**Applicant**" means the legal entity or individual signing the application. This entity or individual signing may be one organization or a single entity representing a group of organizations (such as a consortium) that have chosen to submit a single application in response to a solicitation.

"**Application**" means the documentation submitted in response to a solicitation.

"**Award**" means the written documentation executed by a DOE Contracting Officer, after an applicant is selected, which contains the negotiated terms and conditions for providing financial assistance to the applicant.

"**Awardee**" means the organization, individual, or other entity which receives a financial assistance award from DOE and is financially accountable for the use of any DOE funds or property provided for the performance of the project, and is legally responsible for carrying out the terms and conditions of the award.

"**Budget**" means the cost expenditure plan submitted in the application, including both the DOE contribution and the applicant cost share.

"**Budget Period**" means an interval of time, specified in the award, into which a project is divided for budgeting purposes.

"**Consortium (plural consortia)**" means the group of organizations or individuals that have chosen to complete and submit a single application in response to a solicitation.

"**Contracting Officer**" means the DOE official authorized to execute awards on behalf of DOE and who is responsible for the business management and non-program aspects of the financial assistance process.

"**Cooperative Agreement**" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and Substantial Involvement (see definition below) is anticipated between DOE and the applicant during the performance of the contemplated activity.

"**Cost Sharing**" means the respective share of total project costs required to be contributed by the applicant and by DOE. The required percentage of applicant cost share is to be applied to the total project cost (i.e., the sum of applicant plus DOE cost shares) rather than to the DOE contribution alone.

"**Financial Assistance**" means the transfer of money or property to an applicant or participant to accomplish a public purpose of support authorized by Federal statute through grants or cooperative agreements and subawards. In DOE, it does not include direct loans, loan guarantees, price guarantees, purchase agreements, Cooperative Research and Development Agreements (CRADAs), or any other type of financial incentive instrument.

"Fundamental Research" means basic[1] and applied research in science and engineering, the results of which are published and shared broadly with the scientific community. (From National Security Directive # 189)

"Grant" means a financial assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and no Substantial Involvement is anticipated between DOE and the applicant during the performance of the contemplated activity.

"**Key Personnel**" means the individuals who will have significant roles in planning and implementation of the proposed project on the part of the applicant.

"**Participant**" means any entity substantially involved in a consortium, or other business arrangement (including Subawardees), responding to a solicitation.

"**Project**" means the set of activities described in an application, State plan, or other document that is approved by DOE for financial assistance (whether such financial assistance represents all or only a portion of the support necessary to carry out those activities).

"**Project Period**" means the total period of time indicated in an award during which DOE expects to provide support contingent upon satisfactory progress and available funds. A project period may consist of one or more budget periods and may be extended by DOE.

"**Recipient**" means the organization, individual, or other entity which receives a financial assistance award from DOE and is financially accountable for the use of any DOE funds or property provided for the performance of the project, and is legally responsible for carrying out the terms and conditions of the award.

"**Selection**" means the determination by the DOE Selection Official that negotiations take place for certain projects with the intent of awarding a financial assistance instrument.

"Selection Official" means the DOE official designated to select applications for negotiation of award under a subject solicitation.

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[1] Basic research leads to new knowledge of generic principles in a particular research field.

"Subawardee" means any group of organizations or individuals that have or will have a contractual relationship with the applicant for the performance of work under the proposed project.

"**Substantial Involvement**" means involvement on the part of the government. DOE's involvement may include: shared responsibility for the performance of the project; providing technical assistance or guidance which the applicant is required to follow; and the right to intervene in the conduct or performance of the project. Such involvement will be negotiated with each applicant prior to signing any agreement.

"**Total Project Cost**" means all the funds required to complete the effort proposed by the applicant, including DOE funds plus all other funds that will be committed by the applicant as cost sharing.